EXECUTIVE SUMMARY

The Great Lakes, with 20 percent of the world's surface freshwater, are one of the world's most important natural resources. Human impacts were once devastating, epitomized by a burning Cuyahoga River and a Lake Erie declared dead. Since then, the Great Lakes have improved tremendously. Nutrient targets have largely been achieved and contaminant levels are decreasing or leveling off. However, contaminant levels remain a concern, still triggering fish consumption advisories, and monitoring shows that invasive species continue to enter the Great Lakes with the potential to alter food web dynamics and threaten community structures.

The United States Great Lakes Program is a nested structure of activities, managed and implemented by an alliance of Federal, State, Tribal, and nongovernmental agencies, working in a complementary and collaborative manner with their Canadian Federal, Provincial, and local counterparts, to protect and restore the Great Lakes. This nested structure is meant to parallel the natural boundaries found in the Great Lakes ecosystem: from local landscapes to sub-watersheds, to individual lake basins, to the entire Great Lakes Basin, and beyond. *Places* are stressed over programs, with environmental and natural resource programs applied along naturally-occurring borders instead of jurisdictional boundaries. And because the interactions between ecosystem levels are very complex, this structure is intended to be both flexible and adaptable to respond to the needs of the ecosystem. The goal of these various programs and efforts is to achieve significant environmental improvements through the implementation of a multimedia, ecosystem-based approach in the Great Lakes. This management structure must foster cross-program and cross-agency integration of programs at a variety of scales; from areas of concern (using remedial action plans), to issues of lakewide importance (using lakewide management plans), to those of basinwide concern.

Examples of this last type include: atmospheric deposition of toxicants, exotic species introductions, and the loss of critical habitats and biodiversity. A number of basinwide programs have been undertaken as the most efficient and technically feasible scale for addressing these (and other) stressors, such as the Great Lakes Water Quality Initiative and the Integrated Atmospheric Deposition Network. The impetus for these programs comes from a number of areas: the Great Lakes Water Quality Agreement, congressional mandates, recommendations from the lakewide management plans and remedial action plans, and/or agreements between Federal and State agencies.

Reducing and Virtually Eliminating Toxic Chemicals

The United States Great Lakes Program has made significant progress in reducing persistent toxic substances in the Great Lakes. The remedial action plan and lakewide management plan programs are providing the vehicles for delivering toxic reduction activities both lakewide and at local hotspots. Many of these activities are being guided by the targets set in the historic United States-Canada Great Lakes Binational Toxics Reduction Strategy. The Strategy set national and international commitments for the reduction in the use and release of a targeted list of persistent toxic substances including mercury, polychlorinated biphenyls, dioxins, and furans. Under the United States-Canada Great Lakes Binational Toxics Reduction Strategy, for example, toxic reductions will be achieved through commitments made by the DaimlerChrysler, General Motors, and Ford Motor companies to eliminate polychlorinated biphenyls-containing electrical equipment at their facilities in North America and globally; and by the Olin Corporation to achieve a goal of zero discharge of mercury at its chlor-alkali facilities. Noteworthy progress on mercury reduction has been made under existing agreements with the American Hospital Association, three Northwest Indiana steel mills, and the Chlorine Institute.

Managing Contaminated Sediments

Cycling of contaminants from bottom sediments is a leading source of water quality and food chain contamination. The United States Great Lakes Program provides technical, financial, and field support for Federal, State, and Tribal partners to assist in addressing contaminated sediments. The United States Environmental Protection Agency's research vessel the *R/V Mudpuppy*, for example, has conducted sediment assessment surveys at 26 locations throughout the Great Lakes, including surveys at 24 of the 31 United States Great Lakes areas of concern.

Recent sediment remediations under a variety of authorities have resulted in the removal of large amounts of contaminated sediments, including: (1) a Superfund removal of 150,000 cubic yards of polychlorinated biphenyls-contaminated materials (containing 20,000 pounds of polychlorinated biphenyls) from Bryant Mill Pond on the Kalamazoo River, Michigan; (2) a removal of over 12,000 cubic yards of arsenic-contaminated sediments in the Menominee River, Wisconsin where arsenic levels were so high the dredged material was classified as a hazardous waste; and (3) a Fox River, Wisconsin dredging demonstration project that removed over 10,000 cubic yards of polychlorinated biphenyls-contaminated sediments from the river that is the major source of polychlorinated biphenyls to Lake Michigan.

Protecting and Restoring Habitat and Natural Areas

To protect and restore important habitats, a variety of Federal, State, Tribal, and non-profit organizations are working together to address these issues. We have coalesced around the protection and restoration of biologically rich areas, an idea that is now spreading outside of the Great Lakes Basin. Initiatives include facilitation of local sustainable development efforts such as Springfield, Michigan's development of standards and ordinances that encourage integration of native vegetation into design and development practices, such as stormwater management; and the Les Cheneaux Island's community-driven strategic plan, involving over eighty local businesses, for economic development that depends on and provides for the long-term protection of the rich biological diversity of their Northern Lake Huron Islands, while at the same time planning for economic sustainability.

Monitoring the Health of the Lakes

Through several years of a binational, multi-organizational effort known as the State of the Lakes Ecosystem Conference, Great Lakes Program partners have identified 80 comprehensive, basinwide indicators. The Lakes can now be assessed based on 19 of those indicators, which will provide a consistent means by which agencies can report on the health of the Lakes. Indicator descriptions can be found at:

www.epa.gov/glnpo/solec

Recent biological monitoring reveals a Great Lakes ecosystem in flux. Significant changes to the food web have occurred, likely as a result of invasive species. New invasive species, in addition to zebra mussels, have recently arrived. In 1998, *Cercopagis*, an invasive zooplankton, was discovered in Lake Ontario. It has the potential to disperse throughout the Great Lakes in very high numbers, impacting plankton and fish communities. Scientists are also concerned that the round goby may be a threat to the integrity of the biological community.

Biological monitoring also shows other changes that require attention. Recent data indicate an escalation of the decline of *Diporeia* in Lakes Michigan and Ontario. This amphipod at the base of the food chain is a principal food source for young fish; its decline has serious ramifications for the food web. Various agencies are working together to determine if its decline is related to zebra mussels.

Monitoring of the lakes also provides information for decision-makers. One example is the multi-agency Lake Michigan Mass Balance Study, one of the largest and most detailed investigations of

its kind, providing State and Federal environmental managers with data for toxic and nutrient loadings to Lake Michigan rivers, air, and open waters. Managers can now determine the relative pollutant contributions from the atmosphere, tributaries, and sediments and determine what the most effective long-term steps will be to further reduce levels of toxicants, with the goal of lifting all fish consumption advisories on Lake Michigan.

Protecting Human Health

Protection of human health is of paramount importance. States issue fish consumption advisories to inform citizens of the risks involved in consuming certain varieties of Great Lakes fish due to the presence of toxic contaminants in fish. Susceptible sub-populations such as infants and the elderly, sportfishers, pregnant women, and Tribal members are at an increased risk. A variety of domestic, binational, and multilateral toxic control programs and initiatives are addressing both point and nonpoint sources of pollution to further protect human health.

Great challenges still face us as we work to restore the chemical, physical, and biological integrity of the Great Lakes. The United States Great Lakes Program remains strongly committed to conducting the research, implementing the programs, and monitoring the results of its actions in order to maintain these freshwater treasures. We take pride in our accomplishments to date, but we are not complacent. We understand that much more work is to be done to achieve the goal of a Great Lakes ecosystem where there are no limits on the fish we eat, and no concerns regarding the water we drink and use for recreational purposes. The United States Great Lakes Program is pleased to have this opportunity to report to the International Joint Commission, to Congress, and to our citizens on our continuing efforts to protect these sweetwater seas.

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